

considered excellent. Comparative tensile strengths, percent elongations, and double-fold values found with and without glycerol plasticizer for the native polysaccharide B-1459, the deacetylated polymer, corn amylose, and sodium CMC are presented in Tables II and III. Films were prepared by casting a 1 percent solution of the respective polymer, neutralized to pH 6.6-7.0, and containing 0 percent or 30 percent glycerol, on glass plates to a thickness of  $\frac{1}{8}$  inch and allowing to dry for 4 days under normal atmospheric conditions. Then the films were removed from the plate and humidified under the conditions employed in the tests. Tensile strength was measured at 25° C. and 45 percent relative humidity and fold tests at 22° C. and 50 percent relative humidity.

TABLE II<sup>1</sup>

	Glycerol, percent	Tensile strength, kg./mm. <sup>2</sup>	Elongation, percent	Double folds
Native B-1459-----	{ 0	5.8	3	6
	{ 30	8.6	6	1,500
Deacetylated-----	{ 0	7.6	4	72
	{ 30	6.7	5.9	7,000

<sup>1</sup> Averages of 5 or more values.

TABLE III

	Glycerol, percent	Tensile strength, kg./mm. <sup>2</sup>	Elongation, percent	Double folds
Native B-1459 <sup>1</sup> -----	{ 0	6.5	4	12
	{ 30	4.6	7	3,677
	{ 0	9.4	5	93
Deacetylated <sup>1</sup> -----	{ 30	8.8	10	27,184
	{ 0	7.2	13	900
Corn amylose-----	{ 30	2.0	46	( <sup>2</sup> )
NaCMC <sup>3</sup> -----	{ 0	7.0	10	150

<sup>1</sup> Highest individual test strip value.

<sup>2</sup> Too much stretch for testing.

<sup>3</sup> Cited from R. L. Whistler (ed.), "Industrial Gums," Academic Press, p. 666 (1959).

### Example 1

#### PREPARATION OF NATIVE POLYSACCHARIDE B-1459

Seven and one-half gallons (5 percent by volume) of a whole culture of the bacterium *Xanthomonas campestris* strain NRRLB-1459 is added to 150 gallons of a sterilized (4 minutes at 275° F.) culture medium cooled to 82° F. of the following composition; adjusted to pH 7.0.

	Percent
Dextrose-----	3
Dried distillers solubles-----	0.5
K <sub>2</sub> HPO <sub>4</sub> -----	0.5
MgSO <sub>4</sub> ·7H <sub>2</sub> O-----	0.01

The above is cultured at 82° F. with continuous agitation and aeration (absorption rate approx. 1 millimole O<sub>2</sub>/l./min.), determined by the method of Cooper et al. (Ind. Eng. Chem. 36, 504 (1944)) for 96 hours at which time the glucose content has fallen to about 0.4 percent, the pH has decreased to about 6.0, and the viscosity has increased to about 15,000 cps. The crude native polysaccharide B-1459 is then isolated as follows. The fermented medium is diluted with 150 gallons of water, the pH is adjusted to 5.6 with 0.25 N HCl and 124 gals. of methanol is added to make its concentration 24.7 percent by weight. After removal of the cells by centrifugation 50 lbs. of KCl is added to give a concentration of 2 percent based on the water and then 330 gals. of methanol is added with agitation to give a total methanol concentration of 56 percent by weight. A gelatinous flocculent,

precipitate of low density is separated by centrifugation and purified by redissolving it in 300 gals. of water, adding 50 lbs. of KCl and 480 gals. methanol, recentrifuging and washing in methanol. The precipitate is dried in a rotary vacuum drier and yielded 19.5 lbs. of a light tan, dense, dry product analyzing 4.7 percent acetyl groups.

### Example 2

#### PREPARATION OF DEACETYLATED POLYSACCHARIDE B-1459

Fifteen gms. (0.67 percent) of crude native B-1459 obtained as above is dissolved in 2250 ml. of air-free water in a covered container from which air is displaced by introducing nitrogen. Thirty gms. (1.35 percent) of potassium chloride are added with vigorous stirring and 750 ml. of 0.20 N KOH solution are added resulting in a solution containing 0.5 percent polysaccharide, 1.0 percent KCl, and 0.05 N KOH. The solution is held at 25° C. for 2 hours with continuous introduction of nitrogen gas to exclude oxygen. The solution is then neutralized with 0.25 N HCl and the deacetylated polysaccharide is precipitated as dense, compact particles by adding methanol to provide a concentration of 44 percent by weight, with vigorous agitation. After centrifugation the separated precipitate is redissolved in water to a concentration of 1 percent, the pH adjusted to 7.0, and reprecipitated by adding methanol to provide a concentration of 42-44 percent. The again recovered precipitate is washed and dehydrated in changes of methanol and dried in a vacuum drier to a light tan, dry, dense product analyzing 0.3 percent of acetyl groups.

Having fully disclosed our invention, we claim:

1. A method of preparing the substantially deacetylated derivative of the polymeric polysaccharide B-1459 comprising the steps of, under nitrogen, dissolving 0.67 parts of native polysaccharide B-1459 in 100 parts of air-free water containing 1.35 parts of potassium chloride, vigorously stirring in 34 parts of 0.20 N potassium hydroxide solution, maintaining the mixture at 25° C. for 2 hours under nitrogen, adjusting the pH to neutrality, and precipitating the deacetylated polysaccharide by adding methanol to provide a concentration thereof of 44 percent by weight, said native polysaccharide B-1459 having been precipitated by the addition of methanol and potassium chloride to provide respective concentrations of 56 percent and 2 percent thereof in a centrifuged 72-96 hour aerobic whole culture fermentation of *Xanthomonas campestris* NRRL B-1459.

2. A process comprising fermenting a whole culture of *Xanthomonas campestris* NRRL B-1459 under aerobic conditions for about from 72 to 96 hours to produce native polysaccharide B-1459, which is the acetylated form of a polymer comprising mannose, glucose, and glucuronic acid (as the potassium salt) in the approximate ratio of 2:1:1 and in which the acetyl group comprises 4.7 percent of the native polymer and is present as the ester of a sugar alcohol hydroxyl group, isolating the polysaccharide, forming a mixture containing water, potassium chloride, potassium hydroxide, and the isolated polysaccharide, in the absence of oxygen, whereby the polysaccharide is substantially deacetylated, adjusting the pH of the resulting mixture to neutrality, mixing methanol with the neutralized mixture to precipitate the deacetylated polysaccharide, and isolating the deacetylated polysaccharide.

3. A process comprising forming a mixture containing water, potassium chloride, potassium hydroxide, and native polysaccharide B-1459, the latter being the acetylated form of a polymer comprising mannose, glucose, and glucuronic acid (as the potassium salt) in the approximate ratio of 2:1:1 and in which the acetyl group com-